

### **REMARKS**

This responds to the Office Action mailed on May 3, 2006, and the references cited therewith.

Claims 1, 3, 5, and 13 are amended, no claims are canceled, and no claims are added; as a result, claims 1-13 are now pending in this application. No new matter has been added by way of the amendments.

### **Information Disclosure Statement**

Applicant submitted five Japanese patent documents with English abstracts in an Information Disclosure Statement filed January 27, 2006. The Examiner requested a concise explanation of the relevance of each of these patents. Each Japanese patent document was submitted as background information regarding various processes for preparing pencil lead. Applicant respectfully submits that the following explanations are in compliance with 37 CFR 1.98(a)(3). Applicant respectfully requests that the Examiner review the following explanations and the abstracts of the cited Japanese documents, and mark the documents on the enclosed form 1449.

Japanese Patent Document No. 11286643 (Noboru et al.) discloses a fired color pencil lead that includes a white porous core prepared by bringing a black fired core into contact with a mixture of an oxygen containing boron vapor with a nitrogen-containing gas, and heating the core in contact with the mixture to a temperature of 1,400-2,200 °C to replace the carbon in the black fired core by boron nitride and an ink filled into the pores of the porous core. The document is included as background information with respect to other methods of preparing various types of pencil leads, in this instance, a fired color pencil lead.

Japanese Patent Document No. 3139578 (Shin et al.) discloses a pencil lead that includes graphite having a specified particle diameter into a baked core material that has a specified void content and is obtained by carbonizing a binder. The void content of the core material is 15-30% and the particle diameter of the graphite is 0.5-10 µm. The document states that graphite having a large particle diameter can produce delaminated particles, and graphite with a small particle diameter tends to disperse on writing paper without being changed rather than delaminated. Thus, graphite with particle diameters that are too large or too small prevent optimal uniformity

and brightness in writing. When the void content of a baked core material is too high, the lead is highly resistant to abrasion. These two factors can be optimized within specified ranges to obtain certain desired results. The document is included as background information with respect to the particle diameter of graphite particles and methods of preparing a pencil lead.

Japanese Patent Document No. 4252281 (Yuichi) discloses a pencil lead prepared with an organic binder and an extender pigment. The organic binder can be an ester compound of a straight-chain fatty acid and a polyhydric alcohol, such as dioleic acid neobenzyl glycol ester. The extender pigment can be graphite. The materials can be blended, molded, and burned to provide a pencil lead. The document is included as background information with respect to other methods of preparing various types of pencil leads, in this instance, a pencil lead with an organic binder.

Japanese Patent Document No. 57083570 (Pilot Precision KK) discloses a colored lead produced by extrusion-molding a composition containing at least boron and/or a boron compound, and allowing the molding to react with a gas containing nitrogen, or nitrogen and hydrogen, at high temperature, thereby forming a porous sintering product whose skeleton includes a compound consisting mainly of boron and nitrogen, and charging ink into the pore of the porous sintering product. The boron compound can include borax or boron trichloride, may contain a hardness-controller (e.g. silica alumina), a kneading and extrusion-auxiliary agent (e.g. wax, resin), and a coloring agent, such as ammonia, urea, melamine, or hydrazine. The molding with the coloring agent can be performed at above 300 °C. A sintering binder is not used and thus the lubricity of boron nitride is not impaired. The document is included as background information with respect to other methods of preparing various types of pencil leads, in this instance, a colored pencil lead.

Japanese Patent Document No. 61252278 (Shin) discloses a sintered clay pencil lead prepared by forming a mixture of clay with boron nitride and a pigment material that includes an iron compound and sintering the formed product in an oxidizing atmosphere followed by heat treatment in a reducing atmosphere for blackening. Clay such as kaolin or bentonite can be incorporated and kneaded with boron nitride, a pigment material comprising an iron compound, a shaping agent, optionally a plasticizer, and a solvent. The kneaded product can be extrusion molded into a small wire and wire can be cut into a predetermined length, sintered in an

oxidizing atmosphere, and heat treated for blackening at a temperature of 400-800 °C for a short period of time in a reducing atmosphere to obtain a sintered clay pencil lead. The document is included as background information with respect to other methods of preparing various types of pencil leads, in this instance, a sintered clay pencil lead.

§112 Rejection of the Claims

Claims 3 and 5 were rejected under 35 U.S.C. § 112, second paragraph, for indefiniteness. In light of the amendments to claims 3 and 5, this rejection is respectfully traversed.

Applicant thanks the Examiner for the close inspection of the claims. Claim 3 has been amended to recite proper Markush language. Claim 5 has been amended to clarify the subject matter of the ratio referred to in the claim, as suggested by the Examiner. Reconsideration and withdrawal of the rejection is respectfully requested.

§103 Rejection of the Claims

Claims 1 and 3-13 were rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Sims et al. (U.S. Patent No. 5,496,392) in view of Hirschvogel et al. (U.S. Patent No. 4,091,083), Aylsworth (U.S. Patent No. 1,137,373), and Handl (U.S. Patent No. 5,118,345). This rejection is respectfully traversed.

Claim 2 was rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Sims et al. (U.S. Patent No. 5,496,392) in view of Hirschvogel et al. (U.S. Patent No. 4,091,083), Aylsworth (U.S. Patent No. 1,137,373), and Handl (U.S. Patent No. 5,118,345) as applied to claim 1 above, and further in view of Banker et al. (U.S. Patent No. 5,164,174). This rejection is respectfully traversed.

Applicant claims a simple and efficient process for the preparation of pencil lead from the spent pot liners or a waste of aluminum industries. The process includes several specific steps that allow for a wide range of strength and blackness of various grade pencil leads.

U.S. Patent No. 5,496,392 (the Sims '392 patent)

The Sims '392 patent discloses processes for recycling industrial waste to provide pure metals, metal alloys, metal oxides, molten slag, slag-based products such as mineral wool. The Sims '392 patent does not disclose or suggest a method to prepare pencil lead from the spent pot liners or a waste of aluminum industries. The Sims '392 patent does not disclose or suggest a process for specifically treating spent aluminum pot liners with chromic acid to obtain graphite powder. The Sims '392 patent does not disclose or suggest washing a mixture of crushed spent pot liners and chromic acid with distilled water to achieve a neutral solid mass. The Sims '392 patent further does not disclose or suggest any method for mixing a fine flowing graphite powder with one or more binders, forming a stiff dough, extruding the dough to form discs, drying the discs, heating the discs in a furnace, cooling, and obtaining a pencil lead. Thus, one skilled in the art would not read the Sims '392 patent and find the necessary teachings to arrive at Applicant's claimed process.

U.S. Patent No. 4,091,083 (the Hirschvogel '083 patent)

The Hirschvogel '083 patent discloses a method for the production of graphite-hydrogensulfate by dispersing crystalline graphite particles in sulfuric acid, agitating the mixture, adding hydrogen peroxide to the agitated dispersion and continuing agitation until the graphite is converted to graphite-hydrogensulfate. The Hirschvogel '083 patent does not disclose or suggest a method to prepare pencil lead from the spent pot liners or a waste of aluminum industries.

U.S. Patent No. 1,137,373 (the Aylsworth '373 patent)

The Aylsworth '373 patent discloses expanded graphite and compositions thereof for use in "valve-seats, valve packing, etc." (page 3, lines 99-102), or "a printing plate matrix" (page 4, line 70). The Aylsworth '373 patent does not disclose or suggest a method to prepare pencil lead from the spent pot liners or a waste of aluminum industries.

U.S. Patent No. 5,118,345 (the Handl '345 patent)

The Handl '345 patent discloses a composition for the preparation of pencil lead from clay and graphite, "wherein the clay/graphite mixture is digested with water, pressed, dried and

fired, and at least one alkali phosphate, alkali borate, and/or alkali carbonate is added before or as part of the digestion of the clay or the clay/graphite mixture" (abstract). The Handl '345 patent does not disclose or suggest a method to prepare pencil lead from the spent pot liners or a waste of aluminum industries.

No Prima Facie Case of Obviousness:

The Examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. *In re Fine*, 837 F.2d 1071, 1074 (Fed. Cir. 1988). If the Examiner does not establish a *prima facie* case, the applicant is under no obligation to submit evidence of non-obviousness. M.P.E.P. § 2142. To establish a *prima facie* case of obviousness, three criteria must be met.

First, the reference (or references) relied upon must teach or suggest all the limitations of the claims. See *In re Wilson*, 424 F.2d 1382, 1385 (C.C.P.A. 1970) ("All words in a claim must be considered in judging the patentability of that claim against the prior art.").

Second, the reference (or references) relied upon, coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or to combine references. See *In re Fine*, 837 F.2d 1071, 1074 (Fed. Cir. 1988); *In re Skinner*, 2 U.S.P.Q.2d 1788, 1790 (Bd. Pat. App. & Int. 1986).

Third, the proposed modification of the reference (or references) relied upon must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. In other words, a hindsight analysis is not allowed. See *Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200, 1209, 18 U.S.P.Q.2d 1016, 1023 (Fed. Cir. 1991); *In re Erlich*, 3 U.S.P.Q.2d 1011, 1016 (Bd. Pat. App. & Int. 1986).

There is no suggestion or incentive to modify or combine the cited patents:

The Examiner has not met the burden of showing sufficient motivation for one of ordinary skill in the art at the time of the invention to modify or combine the reference teachings. "When the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the examiner to explain why the combination of the teachings is proper." M.P.E.P.

§ 2142. Also, the Examiner should set forth in the Office Action "an explanation why one of ordinary skill in the art at the time of the invention was made would have been motivated to make the proposed modification" (emphasis added). M.P.E.P. § 706.02(j).

To obtain each element of Applicant's claimed process, the Examiner has relied upon the combination of four disparate patents. The Examiner bears the burden of showing sufficient suggestion or incentive that would have motivated the skilled artisan to modify or to combine the cited patents. Applicant respectfully submits that the Examiner has not met this burden.

The Shortcomings of a Combination of the Sims '392 Patent and the Hirschvogel '083 Patent:

At page 5 of the Office Action, lines 5-6, the Examiner states that "Sims and Hirschvogel are analogous because they both pertain to the same technical difficulty of adding acid to graphite before drying." Applicant respectfully disagrees with the Examiner's assertion. Sims and Hirschvogel are not analogous art, as is evidenced by their subject matter classification. The subject matter of the Sims '392 and Hirschvogel '083 patents belong to significantly different classifications, in both the U.S. classification system and the International system (75/414 and 423/415 R, respectively in the U.S. classification system, and C22B 7/00 and C01B 31/00 in the International system respectively).

Additionally, Applicant respectfully submits that the Sims '392 and Hirschvogel '083 patents do not "both pertain to the same technical difficulty of adding acid to graphite before drying." While both the '392 and '083 patents can be read to add an acid to a carbon-containing composition at a point in their respective processes before the carbon-containing composition is dried, it is apparent that impermissible hind-sight has been used to arrive at the reasoning for combining the teachings of the patents.

The '392 patent discloses (column 6, lines 55-58) "a) blending one or more metal-containing industrial waste materials, at least one carbonaceous reducing agent, and at least one primary fluxing agent into a homogenous mass".

At column 7, lines 5-8, the '392 patent states that the "blend prepared in step (a) further may comprise other ingredients, including, for example, one or more aluminum reducing agents, one or more binding agents, and one or more secondary fluxing agents" (emphasis added). At column 7, lines 17-23, the '392 patent states that "[s]uitable binders include, but are not limited

to, cyanides, starch, sugar processing wastes and byproducts, chromic acid (when cyanide is not present in the formulation) and certain organics such as oils and greases, as well as organic cleaners that are used to remove oil and grease from metals in the metal finishing industry, and non water-soluble binders, such as still bottoms and tars" (emphasis added). Industrial waste materials that can be employed include those listed in Table 1, at column 8, line 41, bridging to column 9, line 26, wherein thirty-three different sources of waste are listed.

Thus, from the disclosure of the Sims '392 patent, one would have to 1) select a "binding agent" from the list of "other ingredients" (aluminum reducing agents, binding agents, secondary fluxing agents), 2) select "chromic acid" from among a list of nine or more general types of binders, the list including, but not limited to, "cyanides, starch, sugar processing wastes and byproducts, chromic acid (when cyanide is not present in the formulation) and certain organics such as oils and greases, as well as organic cleaners that are used to remove oil and grease from metals in the metal finishing industry, and non water-soluble binders, such as still bottoms and tars", and 3) select "spent aluminum potliners" from a list of 33 different potential source materials, in order to arrive at even just two of the elements of Applicant's claim 1 ("collecting spent pot liners from aluminum smelter plants" and "adding chromic acid to the crushed liners...").

Furthermore, it is not clear why one skilled in the art would look to the Hirschvogel '083 patent, which discloses how to prepare graphite-hydrogensulfate, and choose to wash "the solid to remove residual acid it the solid" (column 2, lines 47-48). Neither the Sims '392 patent nor the Hirschvogel '083 patent mentions any advantage of washing the solids in their processes.

This selection of random elements from the Sims '392 patent and their combination with a rinsing step from the non-analogous Hirschvogel '083 patent would need to be undertaken with no guidance or motivation as to why one would choose to select the 'washing step' from the Hirschvogel '083 patent and combine it the various steps undertaken by the Sims '392 patent. Neither the Sims '392 patent nor the Hirschvogel '083 patent is directed to a process for preparing a pencil lead, thus it is not clear from the Examiner's statements why one would combine the cited references to arrive at Applicant's claimed invention.

It is further unclear how one skilled in the art would understand the Sims '392 patent to teach the provision of carbon powder from spent pot liners. Applicant requests that the

Examiner point out in the disclosure of Sims where a free flowing carbon powder is obtained by the methods described therein.

Even if a carbon powder could inherently be provided by the methods of the Sims '392 patent, there is no teaching of how one would obtain the desired size range suitable for making pencil lead. Again, the Sims '392 patent teaches how to use spent pot liners and other industrial wastes to provide mineral wool and various pure metals. Neither Sims nor Hirschvogel teach or suggest a process of preparing pencil lead. Accordingly, one skilled in the art would not read the disclosures of Sims and Hirschvogel and envision a method to produce pencil lead directly from spent pot liners.

Even if one skilled in the art could make the random selections and combinations, arguendo, as suggested by the Examiner, one would still not be able to arrive at Applicant's claimed invention. One would have to further select from various isolated teachings within the disclosures of the Aylsworth '373 patent and the Handl '345 patent.

#### The Shortcomings of Further Combinations:

##### The Aylsworth '373 Patent

On page 5 of the Office Action, the Examiner states that the Aylsworth '373 patent "teaches that when mixing carbon material and acid, the temperature should be 100-130 degrees C". It is respectfully pointed out that the Aylsworth '373 patent does not disclose a method of mixing chromic acid with spent pot liners. The process taught by the Aylsworth '373 patent is directed to providing an expanded, or "fluffy graphite" ('373 patent at page 1, line 28). The Aylsworth '373 patent cautions that the graphite "must not, however, be reduced to extreme fineness, or to an impalpable powder, since if this is done the desired permanent expansion of the graphite will not be obtained. The graphite should not be reduced to particles so small as to pass through a 200-mesh screen, for example." (page 1, lines 72-79).

Thus, Aylsworth cautions against reducing the size of particles to less than about 127  $\mu\text{m}$  (the approximate size of particles that can pass through a 200-mesh screen. Applicant's process can have graphite powder of about 20  $\mu\text{m}$  in size. Accordingly, one skilled in the art would not find any motivation or incentive to combine the teachings of the Aylsworth '373 patent with the Sims '392 and Hirschvogel '083 patents in a manner necessary to arrive at Applicant's claimed

invention. It is unclear why one skilled in the art would look to the teachings of a patent titled "Expanded Graphite and Compositions Thereof" and be motivated to modify the disclosure of the Sims '392 and Hirschvogel '083 patents in a manner necessary to arrive at Applicant's claimed invention. Applicant respectfully submits that the Examiner has not met the burden of showing the motivation or incentive for combining or modifying the cited patents.

#### The Handl '345 Patent

The Examiner states at page 6 of the Office Action, lines 6-7, that "Sims and Handl are analogous because they both are in the field of endeavor of graphite products." Applicant respectfully disagrees with the Examiner's assertion. Applicant has been unable to find any teaching or suggestion that the Sims '392 patent is directed to the field of endeavor or graphite products. Applicant respectfully requests that the Examiner point out any evidence to the contrary.

Additionally, as evidenced by the U.S. and International classification systems, the Sims '392 patent and the Handl '345 patent are in significantly different classification groups and thus are non-analogous art. The Sims '392 patent is classified in 75/414 and C22B 7/00. The Handl '345 patent is classified in 106/19 and C09D 13/00. Furthermore, the Handl '345 patent discloses a method and composition for the preparation of pencil lead using pure graphite powder. The Sims '392 and the Handl '345 patents do not contain any teaching or suggestion to use spent pot liners from aluminum smelter plants to prepare pencil lead.

Furthermore, none of the disclosures of the Sims '392, Hirschvogel '083, Aylsworth '373, and Handl '345 patents teach a process of extracting carbon value from spent pot liners as is claimed by Applicant. None of their disclosures describe a method of treating spent pot liners with chromic acid. One skilled in the art would not be able to predict the quality of carbon powder that could be expected to result from Applicant's claimed process, nor could the efficacy of such a process have been expected when converting the extracted carbon into pencil lead.

The Examiner has not provided any facts gleaned from the prior art that would suggest or motivate the skilled artisan to combine the cited patents in a way necessary to arrive at the presently claimed invention. One of skill in the art, upon reading the complete disclosures of Sims, Hirschvogel, Aylsworth, and Handl, would not have found the teachings necessary to

motivate them to combine elements in such a way such that they would arrive at the instant invention. Thus, the Examiner cannot maintain that a *prima facie* case of obviousness has been made. Accordingly, reconsideration and withdrawal of the rejection under 35 U.S.C. §103 is respectfully requested.

References teach away from the proposed modification or combination:

Motivation may be lacking when the state of the art at the time of the invention in question was discovered pointed researchers in a different direction than the inventor proceeded. Indeed, the Federal Circuit has repeatedly recognized that proceeding contrary to the accepted wisdom in the art represents "strong evidence of unobviousness." *In re Hedges*, 783 F.2d 1038, 1041, 228 U.S.P.Q. 685, 687 (Fed. Cir. 1986); *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1552, 220 U.S.P.Q. 303, 312 (Fed. Cir. 1983).

The Examiner has relied on the Sims '392 patent in rejecting each of Applicant's claims. Applicant respectfully points the Examiner's attention to a specific inaccuracy in the Examiner's analysis of the Sims '392 patent. At page 3 of the Office Action, the Examiner states that "Sims teaches a process of recycling spent aluminum pot lines in which the spent pot liners are collected (see col. 8, lines 15-17 and Table 1, col. 8, approximately line 60)... adding chromic acid (see col. 7, lines 17-24)..."

Applicant directs the Examiner's attention to the statement regarding chromic acid in the Sims '392 patent at column 7, lines 19-20, listing chromic acid as a suitable binder: "chromic acid (**when cyanide is not present in the formulation**)..." (emphasis added). Applicant also directs the Examiner's attention to column 8, line 60, which recites "K088 Spent aluminum potliner", and additionally to column 10, lines 17-21, which recite "Another suitable source of the carbonaceous reducing agent in the present process is spent aluminum potliner (SLP) from the primary aluminum industry, denoted EPA designated waste K088. SLP has been determined to be hazardous **because it contains cyanide.**" (emphasis added). Thus, the Sims '392 patent specifically teaches away from treating spent aluminum potliner K088 with chromic acid because K088 contains cyanide. None of the other patents cited by the Examiner teach or disclose treating spent aluminum potliner with chromic acid. Therefore, one skilled in the art, upon reading the disclosure of the Sims '392 patent, would not be motivated to treat spent

aluminum potliner with chromic acid. Accordingly, a *prima facie* case of obviousness cannot be maintained.

Furthermore, one skilled in the art, upon reading the disclosures of the Sims '392, Hirschvogel '083, Aylsworth '373, and Handl '345 patents would not be motivated to employ spent pot liners from aluminum smelter plants to prepare pencil lead. The Sims '392 patent directs one skilled in the art to methods for preparing pure metals, metal alloys, metal oxides, molten slag, slag-based products such as mineral wool, and does not discuss any method for providing graphite products at all. Sims directs the reader to focus on the metal impurities of industrial waste and does not motivate the reader to prepare pencil lead from a byproduct of the Sims process because such byproducts are not described or discussed in the disclosure.

Accordingly, reconsideration and withdrawal of the rejection under 35 U.S.C. §103 is respectfully requested.

#### References Provide No Reasonable Expectation that the Proposed Modifications will Succeed

Beyond looking to the prior art to determine if it suggests doing what the inventor has done, one must also consider if the art provides the required expectation of succeeding in that endeavor. See *In re Dow Chem. Co. v. American Cyanamid Co.*, 837 F.2d at 473, 5 U.S.P.Q.2d at 1531 ("Both the suggestion and the expectation of success must be founded in the prior art, not in applicant's disclosure."). "Obviousness does not require absolute predictability, but a reasonable expectation of success is necessary." *In re Clinton*, 527 F.2d 1226, 1228, 188 U.S.P.Q. 365, 367 (C.C.P.A. 1976).

The teachings of the Sims '392, Hirschvogel '083, Aylsworth '373, and Handl '345 patents, alone or in combination, do not provide a reasonable expectation of success for controlling the particular heat evolution to be expected from mixing chromic acid with spent pot liners, nor do they provide an expectation of success for extracting the carbon value of spent pot liners to provide graphite of a quality necessary to provide the pencil lead as described by Applicant's claimed invention.

Furthermore, the Examiner has not met the burden to show why one of skill in the art would reasonably believe that modifying the disclosure of the Aylsworth '373 patent (adding certain specific acids to pure crystalline graphite) would be successful to achieve the fine flowing

graphite of Applicant's claimed invention. The Aylsworth '373 patent does not disclose a method of mixing chromic acid with spent pot liners. Spent pot liners comprise both crystalline and amorphous carbon. The quantum of heat evolved from crystalline carbon and amorphous carbon is different and one skilled in the art would be unable to predict the result of mixing chromic acid with a combination of crystalline and amorphous carbon, particularly when it is contaminated with by various metals and ions, such as fluoride, cyanide, aluminum, and alkali, among others, in the spent pot liners.

Additionally, the Handl '345 patent describes a method for preparing pencil lead from pure naturally occurring graphite powder modified by carbon black and clay binders. Crushed spent pot liners cannot be converted into a sufficient pencil lead using the disclosure of the Handl '345 patent because the spent pot liners are highly contaminated. One skilled in the knowledge of the prior art would not know how to decontaminate spent pot liners and simultaneously extract their carbon value to provide a fine flowing graphite for making pencil lead.

Thus, the cited documents provide no reasonable expectation that the Examiner's proposed modification would succeed. Accordingly, a *prima facie* case of obviousness cannot be maintained and withdrawal of the rejection under 35 U.S.C. §103 is respectfully requested.

Dependant Claim 2:

Claim 2 was rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over the Sims '392 patent in view of the Hirschvogel '083 patent, the Aylsworth '373 patent, and the Handl '345 patent, in further view of U.S. Patent No. 5,164,174 ("the Banker '174 patent"). This rejection is respectfully traversed.

At page 8 of the Office Action, lines 14-15, the Examiner states that "Sims in view of Hirschvogel et al., Aylsworth, and Handl teach the process of making pencil lead as previously described". Applicant respectfully disagrees with the Examiner's assertion. Even in combination, Sims in view of Hirschvogel, Aylsworth, and Handl do not teach Applicant's process of making pencil lead because there is no guidance for which steps of each patent to combine and when to combine them. One skilled in the art would not read Sims, Hirschvogel, Aylsworth, and Handl and understand how to make a pencil lead without the aid of the teachings of Applicant's specification. The teachings and disclosures of Sims, Hirschvogel, Aylsworth,

and Handl are far too disparate to combine without the aid of hindsight. The Examiner has failed to point out the necessary suggestion, incentive, or motivation to modify the cited patents, or to combine them in a manner necessary to arrive at Applicant's claimed invention.

Applicant's claim 2 is directed to a simple and efficient process for the preparation of pencil lead from the spent pot liners of aluminum industries, wherein the spent pot liners are cathode blocks. The Sims '392, the Hirschvogel '083, the Aylsworth '373, and the Handl '345 patents do not disclose or suggest processing cathode blocks to provide pencil lead.

The Banker '174 patent is directed to a method "for detoxification of aluminum spent potliner by thermal treatment in a rotary kiln while blended with limestone and metal silicates to destroy cyanides and convert the soluble fluoride salts to relatively insoluble calcium fluoride and fluoride-bearing minerals, quenching the hot kiln discharge with ride salts on the particle surfaces to an insoluble form, and treating aqueous landfill runoff and capture with lime or limestone and recycling the treated water to the process. The treated material is suitable for landfilling in a non-hazardous waste landfill or marketing as a raw material" (the Banker '174 abstract). Banker thus teaches how to dispose of hazardous waste by fusing with lime, but the Banker '174 patent does not disclose or suggest how one skilled in the art could extract carbon value from cathode block pot liners, nor does the Banker '174 patent teach or suggest conversion of a graphite material obtained from this process to pencil lead.

Additionally, while the Sims '392 patent and the Banker '174 patent both involve industrial waste processing, neither contains any teaching or suggestion to prepare pencil lead from the spent pot liners of aluminum industries wherein the spent pot liners are cathode blocks. It would not be obvious to one of skill in the art to combine the teachings of the Sims '392 patent and the Banker '174 patent with select processes of the Hirschvogel '083, the Aylsworth '373, and the Handl '345 patents to arrive at Applicant's claimed process of claim 2. Accordingly, reconsideration and withdrawal of the rejection under 35 U.S.C. §103 is respectfully requested.

#### Dependant Claims 3-13:

At page 6 of the Office Action, in each of lines 6-7, lines 12-13, and lines 19-20, the Examiner states that "Sims and Handl are analogous because they both are in the field of endeavor of graphite products." Applicant respectfully requests that the Examiner point out in

the disclosure of the Sims '392 patent where graphite products are discussed. It is not readily apparent that Sims discloses any graphite products, and thus one skilled in the art would not be motivated to combine the disclosures of Sims and Handl. Without any guidance, incentive, or motivation, Applicant respectfully submits that Sims and Handl cannot be combined in the manner indicated by the Examiner. Accordingly, reconsideration and withdrawal of the rejection of claims 3-13 is respectfully requested.

Claim 3-5 further define Applicant's claimed invention by indicating specific components and ratios of components that can be used in the claimed process. At page 6 of the Office Action, lines 13-15, the Examiner states that it would allegedly have been obvious "to use the graphite of Sims in the process taught by Handl in order to make pencil lead". It is not apparent that Sims discloses any process of providing graphite. Applicant respectfully requests that the Examiner point out in the disclosure of the Sims '392 patent where "the graphite of Sims" is disclosed. It appears that the Sims '392 patent does not disclose graphite, and thus the skilled artisan would not look to Sims for a source of graphite from which to prepare the pencil lead as described by Handl.

Furthermore, the skilled artisan, upon reading the disclosure of the Handl '345 patent (whereby pure naturally occurring graphite is converted to pencil lead by binding graphite with kaoline clay) would not know the efficacy of a carbon powder derived from spent aluminum potliner. The carbon powder derived from spent pot liners would result in an uncertain quality of product, and none of Sims, Hirschvogel, Aylsworth, and Handl provide any guidance to that effect. Only Applicant's disclosure provides the necessary teachings to ascertain the proper method to provide suitable carbon powder and the procedure for forming the powder into pencil lead.

Claims 8 and 9: At page 7 of the Office Action, second paragraph, the Examiner stated that "the graphite produced by the Sims et al. in view of Hirschvogel et al., Aylsworth, and Handl would produce graphite with the crystalline size of about 20 micrometers and have 15% ash as claimed invention does principally because they teach the same process to make graphite." Applicant respectfully disagrees with the Examiner's assertion.

First, even if the disclosures of Sims, Hirschvogel, Aylsworth, and Handl could be legitimately combined, they would not produce the graphite with crystalline size of about 20

micrometers without the aid of the teachings of Applicant's specification. This would be an example of impermissible hindsight. Sims, Hirschvogel, Aylsworth, and Handl, even in combination, do not teach the process of extracting carbon value from spent pot liners by treating the spent pot liners with chromic acid, wherein the graphite powder of the process is of crystalline size of about 20 micrometers (claim 8). The Examiner has failed to identify any teaching or suggestion in Sims, Hirschvogel, Aylsworth, or Handl that would lead one skilled in the art to use graphite powder of a crystalline size of about 20 micrometers in a process for preparing pencil lead using Applicant's claimed process. Reconsideration and withdrawal of the rejection of claim 8 is respectfully requested.

Furthermore, there is also no teaching or suggestion in Sims, Hirschvogel, Aylsworth, or Handl that would lead the skilled artisan to combine their teachings and provide a graphite powder that has an ash content of about 15% as in Applicant's claimed process for preparing pencil lead (claim 9). Applicant respectfully requests that the Examiner point to support for his assertion that the combined teachings of Sims, Hirschvogel, Aylsworth, and Handl would provide graphite powder that has an ash content of about 15%. Reconsideration and withdrawal of the rejection of claim 9 is respectfully requested.

Claim 13: At page 8 of the Office Action, lines 6-9, the Examiner states that "the graphite produced by the Sims et al. in view of Hirschvogel et al., Aylsworth, and Handl would produce lead with the claimed traverse strength of 200-300 kg/cm as the instant invention principally because they teach the same process." Applicant respectfully disagrees with the Examiner's assertion that Sims et al. in view of Hirschvogel et al., Aylsworth, and Handl teach the same process as Applicant's claimed process. Applicant further disagrees with the Examiner's assertion that the graphite produced by any process derived from the teachings of Sims et al. in view of Hirschvogel et al., Aylsworth, and Handl would produce lead with the claimed traverse strength of 200-300 kg/cm.

As discussed above, a *prima facie* case of obviousness cannot be maintained because the required criteria has not been met by the Examiner. Among other reasons, the patents relied upon by the Examiner, coupled with the knowledge generally available in the art at the time of the invention, do not contain any suggestion or incentive that would have motivated the skilled artisan to modify Sims or to combine Sims with the teachings of Hirschvogel, Aylsworth, and

Handl. Pencil lead is not even discussed in the disclosures of the Sims '392 patent, the Hirschvogel '083 patent, nor the Aylsworth '373 patent.

The Handl '345 patent contains no discussion of transverse breaking strength. Applicant respectfully requests that the Examiner point out any discussion of transverse breaking strength or evidence that the combined teachings of Sims, Hirschvogel, Aylsworth, and Handl could provide a pencil lead with the claimed transverse breaking strength. Applicant has provided a novel, simple, and efficient process for the preparation of pencil lead from the spent pot liners of aluminum industries as defined in claim 1. Claim 13 includes the additional element such that the pencil lead obtained from the fine flowing carbon powder has a transverse breaking strength of about 200-300 kg/cm. Claim 13 is thus further patentable and a *prima facie* case of obviousness cannot be maintained. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection of claim 13.

#### Summary

A *prima facie* case of obviousness cannot be maintained with respect to the rejections of claims 1-13. Applicant's claimed process is a novel method of preparing pencil lead that includes treating spent aluminum pot liners with chromic acid. The Sims '392 patent clearly states that chromic acid should not be used as a "binder" for treating spent aluminum potliners (see column 7, lines 19-20 and column 10, lines 17-21). Furthermore, no teaching or suggestion has been identified that would lead the skilled artisan to combine the teachings of Sims, Hirschvogel, Aylsworth, Handl, and Banker in a manner necessary to arrive at Applicant's claimed invention. Accordingly, withdrawal of the rejection under 35 U.S.C. §103 and allowance of the claims is respectfully requested.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 359-3270 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

BIMANRANJAN MAZUMDER

By his Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402  
(612) 359-3270

Date 9/22/2006

By 

Michael H. Haukaas  
Reg. No. 57,111

**CERTIFICATE UNDER 37 CFR 1.8:** The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 22<sup>ND</sup> day of September 2006.

PATRICIA A. HULTMAN

Name



Signature